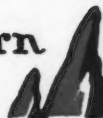


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A Magazine of Western
Ornithology



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Number 6



COOPER ORNITHOLOGICAL CLUB

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BIRD POLLINATION PROBLEMS IN CALIFORNIA

WITH ONE ILLUSTRATION

By A. L. PICKENS

One of the most interesting phases of nature study is the unraveling of the various problems presented by winged creatures seeking the nectar of flowers, and being forced in turn to transfer pollen for those flowers. Some time since, holiday journeys with the family to see the yuccas in bloom afforded a pleasant surprise, an opportunity to learn more intimately the white sage (*Ramona polystachya*). The odd shape of the flowers so excited my curiosity that the yuccas were almost overshadowed in interest. What insect had developed so rare a form in a flower? Pilfering ants, small beetles and some other smaller species were plainly out of the question. The domestic honey bees, present by thousands, are also out of the running because of their late addition to our fauna.

The front of the white sage flower is closed by an upward folded shutter that must be pulled downward to open the tube, and on this the stamens are attached like two horns, while the pistil hangs out to one side, being forced to grow so by the uplifted shutter that turns it aside from the usual medial course (no. I in fig. 66). When the shutter is pulled down it brings with it the stamens, the whole assuming the same general angle (no. III in fig. 66). Sometimes a bee would light on the anterior drooping fold of the shutter and pull it downward. It would occasionally seize the now horizontal stamens and swing on them as a gymnast swings on horizontal bars, thus dusting its abdomen with pollen; and once I saw one, as if seeking a better footing, lay hold of the pistil and draw this to the pollinated surfaces of the body. Other bees stood on the tube, and sought to push the shutter open from behind, while some slipped right between the divergent stamens without dusting off the pollen.

For a large bee like *Xylocopa* the flower is ideal. It alights on the shutter, pulls it down by its weight, and probes under a smaller downward flap that still guards entrance to the tube. Hugging the outer shutter for support turns the pollen faces of the anthers upward, and the divergent stamens bring them up snug, one under each wing of the large bee. Still grasping for a secure footing it reaches out and draws the pistil up under one wing, touching a part of the same dusted by a previous flower. It is a beautiful example of natural reciprocity, but

the striking absence of these insects from large areas of treeless mesas where sage flowers are abundant seems to demand a complementary pollinator. Such a possibility I found in the Costa Hummingbird (*Calypte costae*).

In the afternoon hummingbirds were in evidence on the heated mesa around clumps of *Rhus ovata* which bore berries with an acrid, syrupy coating that possibly lured insects palatable to the birds. As the sun dropped behind the mountains the Costa Hummingbirds became more and more in evidence about the white sage blossoms. It was a marvel of skill for these birds to manipulate the outer shutter and draw the nectar from under the inner and smaller flap without doing this treasury of sweets any harm, though it must originally have been evolved for some

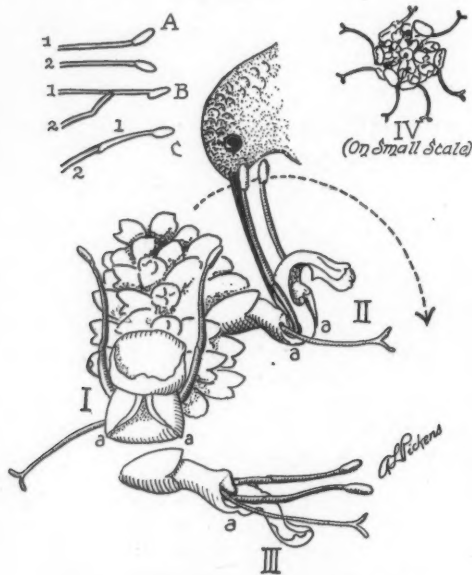


Fig. 66. FLOWERS AND FLOWER PARTS OF THE WHITE SAGE. DRAWN TO SHOW HOW HUMMINGBIRDS BRING ABOUT THE TRANSFER OF POLLEN FROM THE STAMENS TO THE PISTIL.

such insect as the *Xylocopa*. The bird, if I may so express it, had learned the combination and was working it more rapidly and gracefully than the insect. I watched in sheer delight the amethystine iridescence of the males' gorgets glowing gloriously in the gently subdued semi-twilight. It is a surprise to an Easterner, familiar with the Ruby-throated Hummingbird's ways, to find a hummer after pale flowers as if they were favorites, and to see them feeding by twilight. I had forgotten reading in Bailey's "Handbook of Birds of the Western United States" of Dr. Fisher seeing a Costa feeding by moonlight.

In great numbers of these flowers the shutters do not stand vertically in front of the tube, but actually lie backward over them so that the stamens recline on

the supporting mass of calyx and bud material. The bird approaches on wing, inserts its beak delicately beneath the shutter, lifting it gently forward and upward from its normal position and raising the stamens at the same time. The longer ones, when the bird plunges the tip of the beak into the tube, reach the feathers at the base of the mandibles. The shorter ones may merely dust the beak itself. The throat and breast of the bird appear to receive pollen at times, during the position incident to opening the shutter. The hinge of this (see a in fig. 66), being a flexible fibrous one, unlike the rigid metal type has more than one line of motion, so that the anthers move, not only back and forth, but wig-wag from side to side, as they do so thus increasing greatly the area that may be dusted. From the top, some of these clusters, owing to the outward reach of the pistils, suggest the appearance of a very thin bottle-brush flower. (See IV in fig. 66.) This favors the brushing off of pollen if a bird approaches sufficiently close.

Some pistils turn upward and forward and are even better fitted to make contacts, while a few flowers actually have the shutter down, permitting the receiving organ to sweep forward symmetrically between the stamens, as is usual in most species. This is better adapted for receiving bird-borne pollen. Such plants are particularly interesting as affording a possible transmutation more favorable to new conditions. The soft shade of the flowers is one fitted for conspicuousness both before and after sunset, a valuable point with the partially twilight-feeding Costa. I have not so far found a nocturnal moth visiting them.

The long stamens, jointed as they are, hold in themselves an interesting story. They have apparently developed from the simple type seen in more primitive labiates. The next step, seen in *Salvia* of our lawns, shows the lower stamen elbowing to support the upper, sacrificing its anther to do so. In the present species the upper stamen has lost its own base and derives its nourishment from the lower, extended for sake of length. (See A, B, C in fig. 66.)

With Costa Hummingbirds in favor on the treeless mesas, and the large bees in the wooded mountains, the present evolutionary stage of the white sage is an interesting one, and is rendered even more complex by the introduction of the honey bee into its habitat. The Costa, however, at the proper season, turns readily from this flower to the scarlet larkspur (*Delphinium cardinale*) or to hen-and-chickens leek (*Dudleya brauntoni*), while in the nearby tree tobacco thickets (*Nicotiana glauca*) it vies with the Anna and the Black-chinned hummers. One bird I noted showed a preference for the yellowish buds of the white sage, inserting the beak gently between the unopened petals to try the contents, driven perhaps to this by keen honey bee competition. In the nearby mountain cañon, white sage was found growing abundantly in the Black-chinned Hummingbirds' nesting territory, and the birds there were dividing their attention between it and purple pentstemon (*Pentstemon spectabilis*), California thistle (*Cirsium californicum*), and monkey flower (*Mimulus glutinosus*). I wondered if there would be a variation of anther lengths to suit the beaks of the species, but variation and intergradation of length as determined on museum specimens of both birds would make any such point hard to work out.

In passing to another head, I beg to caution the reader that I do not hold *Ramona* (*Audibertia*) *polystachya* to be a hummingbird flower in the sense that its relative the hummingbird sage (*R. grandiflora*) is. I am merely giving evidence to show that its favors are divided, and that its evolution may be more affected by the avian influence than has heretofore been noted.

Nectar-drinking is far more common among birds than some observers have

suspected. During the short period incident to a long-distance telephone message one afternoon, I noted a fraction of a dozen species of native birds drink from the flowers of the avenue of silk oaks in the nearby street. I add here a list of such species as have come to my knowledge, which either visit flowers for nectar or transport pollen.

Flicker (*Colaptes cafer*). C. F. Saunders' "Western Flower Guide", following Chesnut, states that the Yellow-hammer frequents the Indian warrior (*Pedicularis densiflora*) for the abundant nectar.

Scott Oriole (*Icterus parisorum*). Bailey's "Handbook of Birds of the Western United States" tells of orioles feeding among the flowers of a giant agave, the greenish yellow color of which they match in a suggestively protective manner. Dr. Joseph Grinnell states in conversation that this is a habit with the Scott Oriole.

Arizona Hooded Oriole (*Icterus cucullatus nelsoni*). I have observed this bird drinking from silk oak (*Grevillea robusta*) flowers, and the century plant blossoms. Probably the same species is reported drinking from the tree tobacco flowers.

The California Linnet (*Carpodacus mexicanus*) appears to be the chief drinker at the silk oaks.

Pine Siskin (*Spinus pinus*). A specimen brought into the Los Angeles Museum, shot from a yellow-flowered tree, was temporarily yellow possibly from pollen.

Western Tanager (*Piranga ludoviciana*). I have seen this bird drinking from silk oak flowers.

Phainopepla (*Phainopepla nitens*) was drinking from the same species of tree.

Bush-tit (*Psaltiriparus minimus*). Dr. L. B. Bishop reports this species as frequently dusted with willow pollen. I have noted it drinking from silk oak flowers.

Verdin (*Auriparus flaviceps*) was observed near Niland feeding from the flowers of purple loco (*Astragalus purpureus*). No insect could be found in these flowers, and the quest was evidently for nectar.

Mockingbird (*Mimus polyglottos*). A single bird was seen in Alhambra, feeding from silk oak nectaries.

The reception given the silk oak is truly noteworthy, but in its native land it belongs to a genus often visited for nectar by birds. The gladioluses, favorites of hummingbirds in both Atlantic and Pacific states, appear almost as if developed under the birds' influence. Our Anna Hummingbird (*Calypte anna*) has taken strongly to *Grevillea thelemannia*, the color of whose flowers so strongly suggests that of its gorget when lighted for display. Bottle-brush (*Melaleuca hypericifolia*) and its relatives, also the coral tree (*Erythrina christi-galli*) and the various species of eucalyptus, especially the scarlet, are visited by Californian hummingbirds. From the second "Vogelblumenstudien" of Dr. Otto Porsch of Vienna I find all these, or at least members of the same genera, were subject to an avian influence in their own lands (Jahrbüchern für wissenschaftliche Botanik, LXX, 2). Students of ornithophily are indeed indebted to Dr. Porsch for his careful work in this and preceding publications.

Some very highly specialized exotics are finding their way into our gardens. It is easy to observe the migrating hummingbirds visit the flowering oranges and the over-loaded wistaria vines, but not everyone has a chance to study the reaction of these feathered nectar-seekers to plants such as *Streletzia*. More than one representative of this genus is occasionally found in the open in southern gardens, and *Streletzia reginae* was developed for pollination by an African bird. I should think anyone, favorably situated to study the reactions of our birds to this floral oddity, would make no unworthy contribution to science if he enlightened us as to the African flower's reception by American birds.

Zoology Department, University of California, Berkeley, July 19, 1929.

ANOTHER LEWIS WOODPECKER STORES ACORNS

WITH THREE ILLUSTRATIONS

By J. EUGENE LAW

Two previous detailed accounts have recorded the acorn-storing activities of the Lewis Woodpecker (*Asyndesmus lewisi*). Brewster (Auk, xv, 1898, p. 188) records an observation by Sidney French which, while presented as tentative at the time, may be accredited as accurate, it seems to me, in the light of the impressive study furnished by Michael (Condor, xxviii, 1926, pp. 68-69) and the verification which my own observations afford. Ritter (Condor, xxiii, 1921, p. 3, and xxiv, 1922, p. 109) has discussed at length the similar habit of the California Woodpecker.

One hesitates to record in minute detail observations which are, in a measure, duplications of previously published data. However, confirmatory evidence has its value, I believe, particularly as different observers are wont to stress different features and thus round out the factual minutiae. No matter how complete one may think he is making his own record, a later review of it usually reveals gaps that could have been filled. To another observer, the data that will bridge these gaps may have been of primary concern.

Then too, the set of conditions under which the bird works is often different and it is instructive to observe variations in mode when the same function is performed in different environments. New settings compel adaptive thought and may reveal peculiar mental limitations or brilliancies.

The questionnaire circulated by Dr. William E. Ritter concerning the acorn-storing habits of the California Woodpecker had brought to my consciousness the paucity of detail in accounts, other than those mentioned, relating to any similar habit of the Lewis Woodpecker, a species whose winter activities had, in my experience, been correlated closely with the presence of oak trees. It was a pleasurable surprise, therefore, to have a Lewis Woodpecker take up its winter abode in the vicinity of my home, the first observed time in six years that I have resided here.

A rather unusual abundance of this species in southern California in the autumn of 1927 was coincident with a very bounteous acorn crop in the foothill regions. In January, 1928, a Lewis Woodpecker could usually be found somewhere near a certain huge live oak which stands isolated from other trees along a little-used street. On the opposite side of the street is a line of tall poles. These poles contained long deep cracks, many gaping the width of one's finger, and, of course, pinching out toward the heart of the pole.

Sometimes the bird (for clarity of pronouns, I shall call it a male) was resting on the top of some one of the tall eucalyptus trees a hundred yards away. At other times he sortied off a quarter of a mile to other oaks or to sit on a high wire. But oftenest, especially in early forenoon, he worked with acorns, either on the isolated oak or on one of the three nearest poles, 50 and 150 feet away. He seemed to have no competitors of his own species at these stations, but was very suspicious of Flickers which occasionally landed on one of his poles and which he usually drove off.

One had only to sit quietly and obscurely under the big oak for a few minutes any morning, and the woodpecker was sure to come into the tree. Soon it became apparent that the bird returned again and again to the same spot in the tree: the upper side of a large near-horizontal limb where open spaces in the foliage gave elbow room for direct arrival and departure.

When I climbed the tree to inspect this spot, I found a roughly triangular pocket some two inches across on the upper side of the limb. See figure 67 (left). It appeared weathered and much used and was produced by the absence of a block of the thick outer bark so that the grain of the heart wood was exposed. Evidence seemed lacking that it had been made by the woodpecker. A blunt apex of the triangle was down limb and was apparently the point oftenest used in breaking up acorns. A half shuck was still present with a longitudinal quarter of the kernel. This, I believe, with the contour of the shucks which I recovered from the ground under the limb, and of the part-kernels stored in the cracks of the poles, gives a definite clew to the manner of cutting up the acorns; and such observations as I could make with an 8-power lens confirm the impression.



Fig. 67. THE "CHOPPING-BLOCK" (AT LEFT) USED BY A LEWIS WOODPECKER. THE PART-ACORN PICTURED APPROXIMATES ONE FOUND THERE WHEN THE BLOCK WAS FIRST INSPECTED. LEWIS WOODPECKER "SIGN" (AT RIGHT). THESE SHUCKS OF ACORNS WERE PICKED UP UNDER THE CHOPPING-BLOCK. THEY QUICKLY CURL IN THE DRY AIR.

With an acorn wedged into the crevice of the "chopping-block", the bird works around until the axis of his body is parallel with the axis of the nut. Then with blows directed at the middle he splits the acorn in half. There was room in the pocket to push one half of the nut aside while the other half was further broken up. Wedging the half into the same crevice, the woodpecker, from the same position as before, then proceeds to break up the half-kernel which often splits along its axis in nice form to be stored. By this method the shucks of the acorn are released in approximate halves and some of the kernels in quarters.

A heavy rain and wind some weeks earlier had laid the bulk of the acorn crop on the ground. When I began observing this woodpecker there were few acorns left under trees where ground squirrels were uncontrolled. Two hundred yards away, where ground squirrels had probably yielded to the presence of vicious

wolf-dogs, this woodpecker found his ground larder, and from thence he brought acorns, one at a time, to his chopping-block or to the poles. The acorn was always held between his mandibles. On no occasion did I see him carry an acorn with his beak thrust into it.

His mode of procedure, never quite duplicated, seemed to be influenced by two purposes. If his whim directed him to store an acorn entire, he flew to one of the poles, usually well up, sometimes on top, sometimes to an arm. After a trying pause, quite possibly a survey for marauders, he dropped perpendicularly to land again on the pole, then backed down in obvious search for a suitable crack in which to store the acorn. Sometimes he backed down from the start.

If his whim directed him to break the acorn, he usually went to his chopping-block on that large limb of the oak. Sometimes he ate the acorn there, often he ate only a little of it, if any, and carried shucked quarter-kernels to the poles where he wedged them into the smaller cracks, by tapping them with his beak. Kernels so lodged had nicks in them, no doubt made in hammering them in.

Directly under the chopping-block the ground was littered with the half-husks, which curled up as they dried. Some of these shucks are shown in figure 67 (right). A few such shucks could be found under each of the poles, indicating that the woodpecker sometimes broke up an acorn, as I occasionally saw him do, on the tops of the poles. At such times he usually stood at the upper edge of the side, probably with a toe or two overlapping the edge of the top, and the acorn seemed to be close to his body. Both quail and ground squirrels gleaned under the poles and oak for fallen bits.

The chopping-block in the tree had the appearance of having been used in previous years. At other places on this limb and on near-by limbs were roundish holes freshly cut through the living bark, each large enough, some more than large enough, to hold the attenuate acorns locally common, but all the holes were empty. Three such holes appear in the top-center of figure 67 (left).

In view of the known storing habits of the California Woodpecker, one who chooses to ponder on the urge and phylogeny of instinct may here find food for thought. This Lewis Woodpecker, while working at storing and eating acorns, seems to be playing with an idea which it does not crystallize into purpose. It is erratically making holes similar, but less accurate in size, to those regularly made with apparent purpose by the California Woodpecker, but the storing idea of this Lewis Woodpecker is limited to natural crevices. Or has the abundance of natural crevices in these utility poles relieved the bird of the necessity, probably present before the advent of man-placed poles, of digging its own storage holes, while the urge to do so, inherited as part of the acorn-gathering episode, finds expression in an occasional outburst of hole-digging?

But must we, to explain these actions, compose involved evolutions based on the mysterious persistence of primitive habits? If habits make their impress on morphological change, so does structure direct the course of habits. The beginnings, at least, of the acorn-storing habit seem to be rather positively forced on the individuals of each new generation of woodpeckers by the limited tools with which they are supplied: a beak for piercing and, whether by structure or because of the mental incapacity of the bird, feet unfitted for holding acorns.

When a woodpecker seizes an acorn in his beak, there are several mechanical difficulties which he must solve. To begin with, so long as he carries the acorn in his beak he cannot eat the kernel. If he lays it down anywhere but on the

ground it will roll away, unless it is in a groove or niche, and before he can drive his beak into its smooth round surface he must have it tightly held. As the ground does not hold an acorn securely, some other base is naturally sought. Lodgement of many acorns in cracks seems to be a logical sequence. Their abandonment there is just as logical.

And as to the small holes which they make, we should, perhaps, have in mind a necessity which a woodpecker *cannot ignore*, namely, that of keeping its beak sharp. For it is largely by constantly driving its beak into the fiber of wood that sharpness is maintained. For much of the year the Lewis Woodpecker lives largely on insects caught in the air. For briefer periods fruits and mast supplement this diet. None of these can seriously whet the beak unless it be the acorns. There-

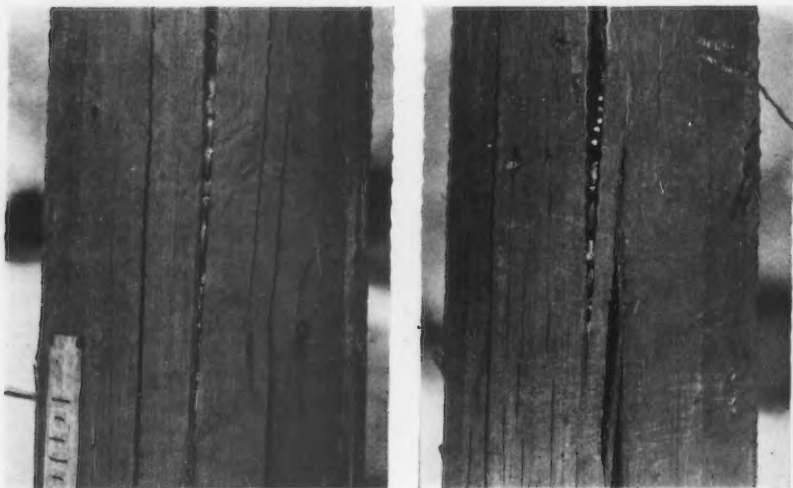


Fig. 68. ACORNS AND ACORN KERNELS STORED BY A LEWIS WOODPECKER IN A STREET UTILITY POLE.

Photographed by Dr. Spencer R. Atkinson.

fore, hole-digging might seem to be a vital function in maintaining a sharp beak. Even the depth of the holes has a suspicious correlation with the length of the beak.

The thrill of life is in activity. Healthy creatures must have an outlet to the urge for action. They must keep active to keep fit. Specialization prescribes the activities of woodpeckers to a narrowed field. Pastime for birds, as for human beings, may reflect functional necessities. Indeed, what would Lewis Woodpeckers more naturally do with their spare time if they did not store acorns at the season when a score or two of acorns and an hour or two spent breaking them up furnished attractive food for the day, or if they did not dig holes to keep their beaks sharp at the season when only a slightly longer part of the day had to be used to catch the day's ration of insects? This thought may be less facetious than it appears to be.

Of course, I realize that these suggestions do not account for the laborious persistence with which acorn-storing woodpeckers continue their work for months at

a time. I have no doubt that there is an element of greed, urged, perhaps, by visible competition with jays and rodents. But when a bird, as did the one under observation, deliberately flies to the same distant point time after time, day after day, and week after week, and on each return brings an acorn to his definite storage place and there follows a definite routine, even though the routine is prescribed by physical factors, that bird must be gratifying an innate urge unexplained by visible influences.

Before this Lewis Woodpecker ceased bringing acorns, he had stored from one to many acorns or acorn meats in every crack of sufficient size on all three of the power poles, down to 18 inches from the ground. (See figures 68 and 69.) There was no selection as to exposure of the opening. As some of the cracks were wide, the acorns therein appeared to have been thrust in about as far as the thickness of the woodpecker's head would allow him to place them, and probably too

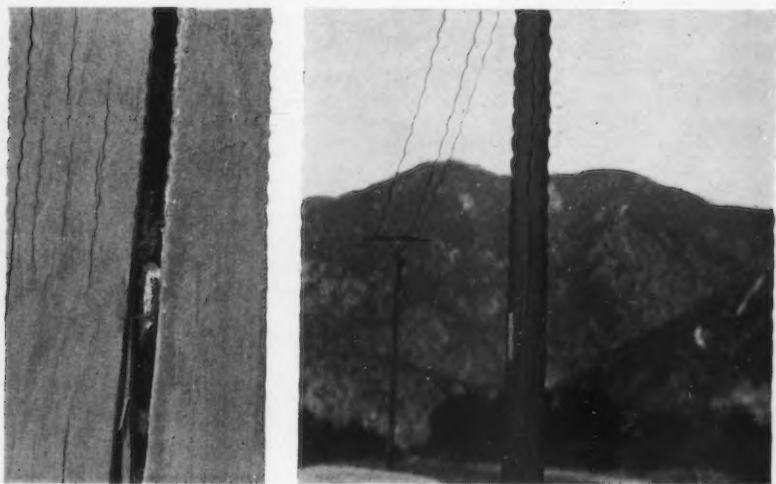


Fig. 69. A CLOSE-UP OF THE SHUCKED ACORN KERNELS STORED IN A CRACK BY A LEWIS WOODPECKER (LEFT). ONE OF THE STORAGE POLES (RIGHT). MOST OF THE ACORNS WERE BROUGHT FROM THE CLUMP OF OAKS IN THE DISTANCE BEYOND THE POLE.

Photographed by Dr. Spencer R. Atkinson.

far ever to be recovered. Some few of the cracks had narrow splinters freshly chipped off their edges, to no obvious purpose.

It was notable that, while the bird devoted himself to storing and eating acorns during the cool morning hours, or on cloudy days, just as soon as the air warmed up he ceased bringing acorns and devoted himself to catching insects on the wing, usually using the poles as his base of operation. Whether or not he again indulged in acorn activities later in the day, I did not determine.

These observations and the fact that, as far as I could observe when the poles were re-inspected in the early summer following, most of the acorns and acorn meats seemed to be still present in the cracks, and both intact and edible, led me to think that this storing activity was at most merely for morning and cold day

food in winter when flying insects are not about. I have no evidence, however, that this woodpecker ever ate any acorns once stored. As February, 1928, was balmy in this section, and flying insects probably became increasingly available, it is not surprising, perhaps, that he abandoned his acorn larder, though, of course, some fatality may have overtaken him.

A year later, in early winter, 1929, an inspection of the three storage poles showed much of the acorn supply still present in the cracks. As no less than three Flickers were flushed from one of the poles, from which they were trying to dislodge the acorns, the stock remainder consisted largely of acorns that had gone in too deep for dislodgment. Many had been broken up in the cracks. The Lewis Woodpecker did not, I think, return this winter.

In conclusion, I should like to brief certain inferences drawn from the observations herewith presented. I grant that they are largely hypothetical.

1. For the most part, at least, it was the meat of the acorns and not the worms in the acorns that this Lewis Woodpecker was after. The fact that he stored sections of shucked kernels seems significant in this connection.

2. This bird seemed entirely content to use ready-made cracks for his storing, while certain holes in the bark of the oak (which I believe he made) remained empty.

3. For a woodpecker whose food is obtained by means other than by drilling into wood, much of his hole-cutting may have the functional purpose of maintaining a sharp beak. Acorn-breaking may serve this function during the period when mast is eaten.

4. Physical limitations may be controlling factors in some of the apparent technique which accompanies acorn-eating and hole-cutting.

5. The nature of the food sought and the method of eating it may provide the dominant motive for leisure time, and stimulate activities of little economic value to the woodpecker.

I acknowledge with gratitude the kindly interest of my neighbor, Dr. Spencer R. Atkinson, who took a series of photographs of the stored acorns from which the prints for figures 68 and 69 were selected.

Altadena, California, March 13, 1929.

REACTION TOWARD CAPTURE AMONG CERTAIN SPARROWS

By JOSEPH MAILLIARD

Among birds captured for banding purposes there is noticeable a considerable variation in the reactions of different genera toward the realization of confinement in a trap, and also a great difference noticeable between individuals of any one species. These variations and differences were well brought out during some bird banding work recently carried on near Woodacre, Marin County, California. Golden-crowned and Nuttall sparrows (*Zonotrichia coronata* and *Zonotrichia leucophrys nuttalli*), the former taken in some numbers, and the Marin Song Sparrow (*Melospiza melodia gouldii*) that occasionally appeared in the traps were the species upon which observations were made.

As compared with the lively little *Melospiza* the *Zonotrichia* are slow-moving birds, but there seemed to be much more than a mere matter of speedy movement governing the different reactions in the two genera. While the Nuttall exhibited a little more activity than did the Golden-crowned Sparrows they were taken in such relatively small numbers that a fair comparison between these two species could not well be made, so that the observations herein set down are confined almost entirely to the other two species named above.

Upon their realization of being confined within its walls individuals of the genus *Zonotrichia* run more or less around the trap, trying to find some opening through which to escape, but they do this in a heedless, haphazard manner, blindly as it were. The *Melospiza*, on the other hand, travel around much more rapidly inside the trap, but ever with a keen eye for an opening and with a brain ready to take instant advantage of any possibility that may attract the eye, it being understood that these reactions are what take place without extraneous causes, such as the sudden approach of a person or of a dog or cat to the trap, bringing about a state of overexcitement and making them "lose their senses", to use a colloquial expression.

The traps used in this work were almost all of the "Sprot" type, rectangles of wire netting about 24 by 30 inches and five inches high, placed on the ground. The entrance to this type of trap is a sort of funnel, of wire netting, projecting into one end. The large outside opening of this funnel is easily found by the birds wishing to enter, but the opening at the small end, on the inside of the trap, is almost invariably overlooked by the Golden-crowned Sparrow in its efforts to escape and is seldom found by the Nuttall, although captive birds pass across it again and again and often pick up food right beside it without discovering that it is a means of egress. If a song sparrow is in the trap, however, it behooves the bird bander to stop up the funnel entrance before he tries to herd the captives into the small catching box in the corner, for the sharp eyes and active brains of at least some members of the genus *Melospiza* are extremely apt to find that small opening and the birds to dart through it to liberty.

This difference in relative quickness of perception in the two genera was also shown in other ways during this banding work. A small door, hinged at the bottom, is arranged at a corner of each Sprot trap, to be laid open so that captive birds may be herded for examination or for banding into a small portable catching box that is placed before the opening. When it is necessary to leave a trap unvisited for so long a period as to run the chance of birds injuring themselves in trying to escape, I often leave this small door partly open, dropping the top at

such an angle as will permit the exit of a small bird, but not sufficiently open to allow the entrance of a cat, for instance, or even of an unwelcome quail. With such an arrangement of the door a captive song sparrow will find that opening, as a rule, very quickly, while often a Golden-crowned Sparrow may be in the trap for an hour or more without noticing this easy route to freedom. The majority of captive *Zonotrichia* undoubtedly do find this opening and soon escape, but I have often discovered one or more individuals in a trap with the catching box door partly down and have watched them run around without noticing that there is any opening there, though most of them would probably find it in time. Of course, when the door is left entirely open, as it is for any great length of time, birds of either genus will find the opening before long. I have sometimes found "Zonos" in a trap with the small door wide open and have succeeded in getting the catching box in position for use before the birds had noticed that there was nothing there to stop them. A *Melospiza* on the other hand, almost invariably went through that opening like a flash.

To cite another instance of the difference in quickness of perception in these two genera, when inserting one's hand into the catching box of a Sprot trap, or into a compartment of a Potter trap, when the captives are *Zonotrichia* it is necessary to be only ordinarily careful about guarding the possible avenues of escape between one's wrist and the sides of the door, for members of this genus are usually facing away from the opening while trying to avoid one's hand. With a *Melospiza* in the trap every precaution has to be taken, as a captive of this genus is as apt as not to be facing the door in defiant and watchful attitude, even after the hand is inserted, and will dash past one's wrist if any opening shows itself. More than one song sparrow has managed to slip past my guard in spite of extra care used to avoid such a contingency. The number of individuals of *Zonotrichia* under observation was something like twenty times as great as the number of *Melospiza*. A few of the former did get away from me, mostly through momentary carelessness on my part, but there were nearly as many such escapes among the relatively few individuals of *Melospiza* that entered the traps as there were among the hundreds of *Zonotrichia* that had done so.

As to individual reaction of members of these two genera it can be said that great differences appeared. This was the more noticeable among the *Zonotrichia*, naturally, on account of the greater number involved, but the proportion of individuals of this genus that "used their heads", as Dr. William E. Ritter recently expressed the idea, was observed to be very much smaller than was the case among the *Melospiza*, even though not enough were taken of the latter genus to enable one to reach an approximate estimate of this difference. Fortunately, enough of the *Zonotrichia*—over 400—were taken to show some interesting variations in this matter of using the head.

As mentioned above, most of the Golden-crowns that were driven into the catching box merely fluttered or ran around, trying to force their way through the netting at the end of the box or to jump through it on top; but occasionally some wiser individual tried the same trick that so many of the song sparrows tried and persistently faced the door, running around from one side of my hand to the other in an endeavor to get past the obstructing wrist. Some of this reaction may have been only a chance happening; but some attempts at escape in this manner appeared to be intentional and were deliberately repeated several times in succession. The same reaction was sometimes shown by Golden-crowns caught in the Potter compartment traps, where the larger door is harder for the bird bander to keep

protected and where a bird facing the door has quite a chance to get past the hand of the bander who may be careless enough to leave any opening between his wrist and the sides of the door.

It seemed as if the brains of some, if not all, of these sparrows did not readily retain impressions beyond a very limited succession, even when such impressions were quite closely related, as was shown in the case of many chronic "repeaters" that visited the Sprot traps. The repeaters evidently remembered the food that they had appreciated upon their previous visits, else they would not have returned, but they apparently forgot that their enjoyment invariably ended in their being caught in the small box at a corner of the trap. This box has wooden sides and has netting on the far end and on top. When driving birds into it the top is covered so that light shows only through the end netting and, thinking easily to escape that way, the birds usually entered the box readily enough for the first time or so, though some individuals even then showed great reluctance to enter it. Some of these birds, after several repeats, became more and more anxious to avoid entering the catching box until at last it became a matter requiring much patience to herd them into it. They apparently had learned to associate their entrance with the idea of being grasped by a human hand. The point that I wish to bring out is that these birds quickly learned and evidently remembered to associate food with the traps, for they would gather there to obtain the food; they learned and remembered that entrance to the catching box meant that they would be grasped by a person's hand, from which action they feared injury; the successive impressions of being unharmed by the hand and of being invariably set free they did *not* appear to retain.

In contradistinction to the above there were some individual repeaters that almost always entered the catching box with little or no fuss about doing so and which remained quiet in the hand when caught; but there is no way of knowing whether such reaction resulted from temporary paralysis caused by fear, from a recollection of ultimate freedom always having resulted from their being handled, from a philosophic acceptance of what slight discomfort they must endure in return for the food they get in the trap, or whether there was an entire absence of reaction as a consequence of innate stupidity! Toward the end of the banding season, as spring came on apace and the same individual Golden-crowns were simply making rounds of the traps, it seemed as if nearly all of them were growing more and more reluctant to enter the catching box.

As the winter sojourn drew to a close, one case of very evident use of the head was exhibited. In accordance with a plan to attract birds to my banding station at Woodacre, where the above observations were made, a brush pile was started with the idea of building it up to a good size. At first, brush was lacking, the pile was low and no sparrows came to it, although they occasionally visited bushes not many rods away. The pile was added to now and then, and sheltering material such as bits of old boards, pieces of roofing paper, even part of an old Ford car fender, were added until just as the northward urge was beginning to thin out the band, the pile had been built up to over six feet in height. One day its advantages were suddenly recognized by the remaining Golden-crowned Sparrows, which at once took possession of it. During the rest of their stay a couple of two-compartment Potter traps caught more sparrows at this brush-pile than did the three large Sprot traps at the old trapping ground that had been used for the previous six weeks; and it was the same lot of sparrows, as shown by their bands.

California Academy of Sciences, San Francisco, July 3, 1929.

SOME RESULTS OF BIRD BANDING IN 1928

WITH FIVE ILLUSTRATIONS

By JOHN MCB. ROBERTSON

Bird banding as a method of bird study shows a steady growth in the West, both in the number of persons operating trapping stations and in the number and variety of birds banded. The purpose of this article is to show, by means of charts, some of the results obtained during 1928 as shown by reports made to the Western Bird Banding Association.



Fig. 70. LOCATIONS OF BIRD BANDERS IN WESTERN UNITED STATES, AS KNOWN TO BE ACTIVE DURING 1928.

Bird banders frequently wonder why they do not get greater results, why they do not get more returns of their birds from distant stations, and why they do not frequently capture birds that have been banded by some one far away. A glance at figure 70 will show how widely scattered the active banding stations are and what an element of chance must enter in, where the vast area, the scarcity of trapping

stations, and the relatively small number of birds banded are all factors against the frequent occurrence of distant returns. This chart shows bird banders who were active during 1928 as follows: Alberta, Camrose one; British Columbia, Barkerville three, Courtenay one, Duncan one, and Vancouver one; Washington, Seattle one, Tacoma one, Sunnyside one, College Place one, and Pullman one; Oregon, Salem



Fig. 71. FURTHER RETURNS OF GULLS Banded NEAR CAMROSE, ALBERTA, IN JUNE, 1927.

one, and Eugene one; Idaho, Grangeville one; Montana, Moiese one; Utah, Brigham one; Colorado, Denver two, and Calcite one; Arizona, Oracle one; California, Yountville one, Benicia one, Berkeley three, Oakland one, Warm Springs one, San Francisco three, Stanford University two, Los Banos one, Big Creek two, Porterville one, Delano one, Bakersfield three, Los Angeles twelve, Pasadena eight, Glendora one,

La Verne one, Claremont three, Redlands one, Pomona one, Buena Park two, Escondido one, San Diego two, and Imperial one. Some banding was done at places not shown here: the San Bernardino Mountains, Mono Lake region, Marin County, Davis and Chico in California, in southern Arizona, and in Alberta.

Of the seventy-four banders here indicated, sixty-six report 23,091 birds, of 164

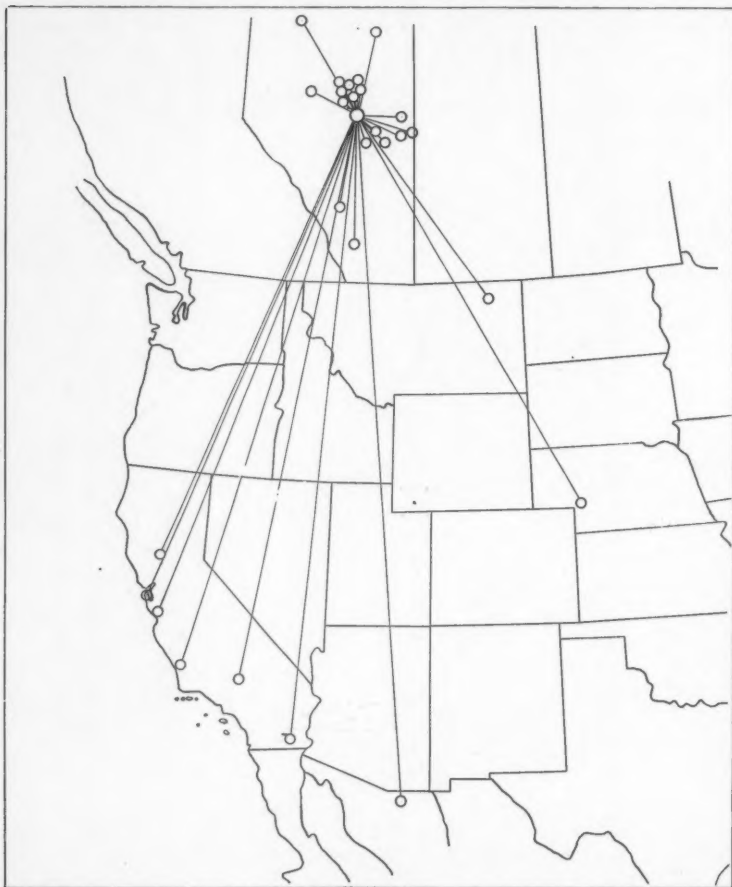


Fig. 72. RETURNS OF GULLS Banded NEAR CAMROSE, ALBERTA, IN JUNE, 1928.

species or subspecies, banded during 1928. The species or subspecies rank as follows: Mallard 7493, Linnet 3249, Pine Siskin 2159, Gambel Sparrow 2017, Pintail 1241, Golden-crowned Sparrow 854, Shufeldt Junco 658, Nuttall Sparrow including *Zonotrichia leucophrys pugetensis* 640, all the others falling below 500 individuals banded. The banders rank as follows: Frank H. Rose 7466, T.-T. McCabe 3624, the Micheners 3335, Ernest D. Clabaugh 889, Joseph Mailliard 647, E. W. Ehman

636, Wright M. Pierce 530, Arnold and Ainsworth for the California Division of Fish and Game 503, all the others falling below 500 birds banded.

In *The Condor* (xxx, 1928, p. 354) appears a chart showing returns of California and Ring-billed gulls banded by Frank L. Farley at Bittern Lake, near Camrose, Alberta, in June, 1927. Two additional records have come to light since that chart was published: One bird at Lesser Slave Lake, Alberta, August 14, 1927,



Fig. 73. RETURNS OF MALLARDS Banded AT LAC STE. ANN, ALBERTA, IN 1928.

and one bird at Mexicali, Lower California, November 14, 1927. The records of eight more birds of this group are now available and are shown in figure 71. Mr. Farley states that no banded birds were seen at the breeding colony while banding was being done in June, 1928, and it was hoped that some of the returns would show where these birds were during the nesting time of the adults. However, no

definite light has been thrown on this question. The returns shown here are: El Centro, California, April 6, 1928; Redland, Alberta, July 4; Wilson Lake, Idaho, July 19; Laramie, Wyoming, October 15; Fairfield, Montana, October 24; Sheridan, Wyoming, October 27; Lake Helena, Montana, November 19; and Czar, Alberta, December 3, 1928.

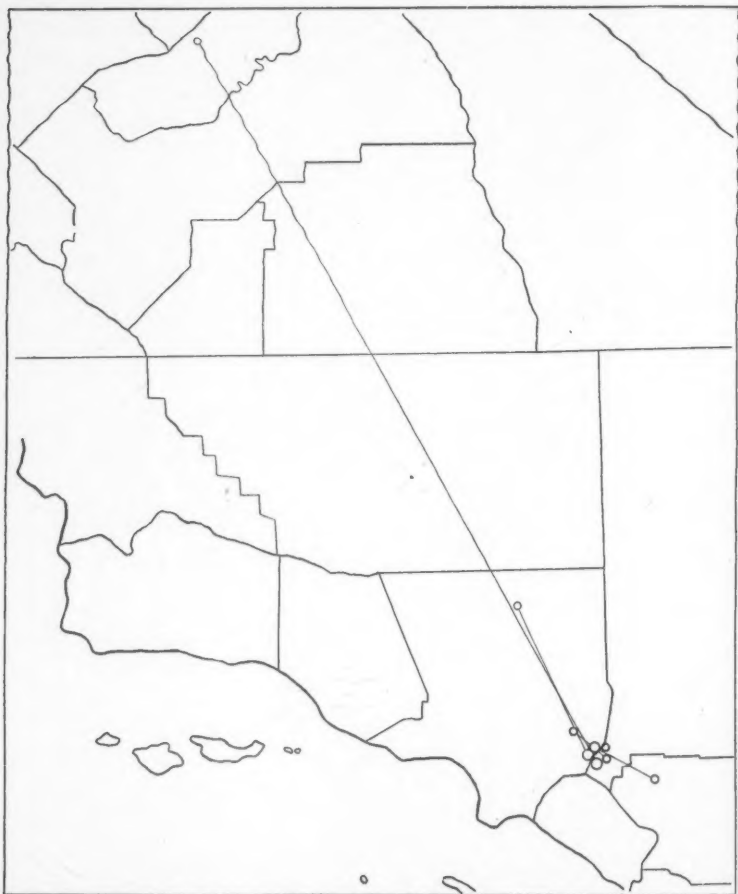


Fig. 74. RETURNS OF HAWKS AND OWLS BANDED BY E. L. SUMNER, JR., IN SOUTHERN CALIFORNIA.

From birds banded in the same breeding colony in 1928, Mr. Farley has forty-one returns which are shown in figure 72, as follows: Edmonton, Alberta, July 30, August 6, 7, September 2 two birds, 7, 15; Cooking Lake, Alberta, July 31; Lac Ste. Ann, Alberta, August 8, September 15; Claresholm, Alberta, August 12; Lac La Biche, Alberta, August 14; Clover Bar, Alberta, August 15; Cadogan, Alberta,

August 15; Lesser Slave Lake, Alberta, August 19 two birds, 31, September 15; Tofield, Alberta, August 20; Big Valley, Alberta, August 21; Castor, Alberta, August 25; Lancaster, California, September 1; Consort, Alberta, September 12; Calgary, Alberta, September 15, 16, 20; Lake Wabumum, Alberta, September 15; Camrose, Alberta, September 15; Waskatenaw, Alberta, September 16; Hayter, Alberta, September 22; Edgerton, Alberta, September 26; Kaleland, Alberta, October 3; Ogallala, Nebraska, October 17; Frazer, Montana, October 21; Cananea, Sonora, October 21; Watsonville, California, November 4; Brawley, California, December 8; Colusa, California, December 30; San Francisco, California, January 6, 1929; and San Luis Obispo, California, February 22, 1929. *The wide dispersal of these birds during the fall migration, as shown by the report of birds from northern Montana and from below the Mexican border on the same day, and the fact that so many of these birds are killed, are points worthy of note.*

The chart of returns of Mallards banded by Frank H. Rose, at Moiese, Montana, in the fall of 1927, published in The Condor (xxx, 1928, p. 321), shows a very definite southwesterly movement from that area. In contrast, figure 73 shows returns of Mallards banded during the summer of 1928, by Paul E. Page, at Lac Ste. Ann, Alberta, about 450 miles north of Moiese. These returns are: Westlock, Alberta, September 29; Vandalia, Illinois, October 25; one trapped by Rose at Moiese, Montana, November 1; Eagleton, Montana, November 2; Wayland, Missouri, November 2; Jackson County, Kansas, November 4; Pratt, Kansas, November 5; De Witt, Arkansas, November 11; Wentworth, South Dakota, November 14; Orchard, Nebraska, December 28; and San Angelo, Texas, January 29, 1929.

Figure 74 shows some returns of birds banded by E. L. Sumner, Jr. Nestling Barn Owl no. 237546 banded in Ganesha Park, Pomona, California, April 16, 1925, was taken at Arlington, California, July 2, 1925, a distance of about twenty miles. Nestling Barn Owl no. 367174 banded in the Congregational Church, Pomona, California, May 14, 1925, was shot at Covina, California, September 19, 1925, a distance of about eight miles. Nestling Barn Owl no. 336936 banded in the San Antonio Wash, near Pomona, California, April 8, 1926, was shot at Ontario, California, October 19, 1926, a distance of about five miles; and no. 336937, one of the same brood, was captured and the band removed at Chino, California, in August, 1926, a distance of about five miles. Nestling Barn Owl no. 233520 banded at Chino, California, May 24, 1925, was shot at Chino, February 13, 1926.

Nestling Long-eared Owl no. 543281 banded April 10, 1928, at Rancho de los Tres Hermanos, in the Puente Hills of southeastern Los Angeles County, was taken four miles from Lancaster, California, between December 29, 1928, and January 3, 1929, a distance of about fifty miles.

Nestling Red-tailed Hawk no. 320774 banded in Carbon Canyon, southwestern San Bernardino County, May 4, 1928, was caught in a coyote trap six and one-half miles northwest of Raymond, Madera County, California, July 5, 1928, a distance of about 250 miles.

Buena Park, California, July 21, 1929.

FROM FIELD AND STUDY

Vocal Performances of the Rock Sparrow in Oklahoma.—The Rock Sparrow (*Aimophila ruficeps eremoeca*) has been found in rocky situations in five different localities in central and western Oklahoma: the Arbuckle Mountains in Murray County; the Wichita Mountains in Comanche County; near Headrick in Jackson County; gypsum hills in Blaine County; and on the mesas in Cimarron County within nine miles of Colorado and five of New Mexico. Although the books call these birds shy, I have found the males tame, singing in fairly close proximity to the observer. They do not often take wing, but instead disappear among the rocks.

On June 4 and 5, 1929, I studied birds near the Lower Narrows of West Cache Creek on the hillside across from Eagle Mountain in the Wichitas, watching a young Red-tailed Hawk in its nest on the face of the cliff, seeing Rock Wrens, and hearing the songs of a Black-capped Vireo and a Cañon Wren. A Rock Sparrow, about a hundred feet from my seat, had three singing posts, a live cedar, a dead cedar, and a favorite rock. I searched in vain for his nest and decided it must be in a tussock of grass on the cliff below me. I did not see his mate at all.

At 9:50 a. m. he appeared on a boulder, gave a queer, nasal *pur-pur-pur*, then flew to a dead cedar overhanging the cañon and began to sing, hardly opening his bill at all. After about a dozen songs he flew. At 10:15 he was back again, singing steadily eight times a minute. A male Painted Bunting that had a nest 25 feet to the eastward alighted in the cedar and the sparrow promptly chased him off, leaving the place himself after a few more songs. At 10:35 he started again, but stopped to peer down at a female Cowbird that was searching in the bushes below him; when the cowbird noticed me she flew away. Unlike the Song Sparrows in Columbus, Ohio, he gave no note of alarm at this visitor, but began to sing once more. (The cowbird returned the next morning at 9:45 accompanied by a male, and went to the black-jack oak containing the bunting's nest, but upon finding the female incubating, left at once.) From 9:30 to 11:30 the sparrow sang perhaps seventy to eighty songs, from 2:30 to 3:30 p. m. not more than a dozen, and from 9:30 to 11:45 the next morning, about twenty-five.

The usual song is a chirping of six to nine notes, the first two-thirds ascending very slightly, the rest descending in a more marked degree. Its length was 1.2 to 1.5 seconds. When a bird was singing steadily, the number of songs per minute ranged from seven to nine, while the intervals from the beginning of one song to the beginning of the next varied from 4.5 to 10.7 seconds, the average of thirty-one being 7.3 seconds. The song is not loud, and to my mind not at all musical.

On June 6, in another locality west of Camp Boulder, I heard a different song from two birds that the afternoon before had sung the ordinary one. The general character of both was much the same. This new song might be written *hur zig-zig-zig-ziger zah*, both the first and last notes being somewhat lower than the middle portion. Its length was 1.1 seconds; six intervals between beginnings of songs ranged from 9 to 10.5 seconds, averaging 9.8 seconds. From 5:50 to 6:05 a. m. one bird sang this song quite regularly six times a minute.

The most peculiar thing about the Rock Sparrow is its manner of scolding. None of the many birds I had seen had been carrying food, nor had they objected in any way to my presence until at 2:30 p. m. on June 5, when I reached a rocky hillside covered with black-jack west of the camp. There I was startled by the most extraordinary outburst of scolding and complaining, very loud, shrill and nasal. The note sounded to me like *peer*, and later, when more vehement, *tau*. Sometimes a few gentle *tsips* were mixed into the tirade. At 2:40 this Rock Sparrow uttered 71 *peers* and 1 *tsip* in one minute; at 2:56, after I had started to explore, there were 128 *peers* and 16 *tsips* in one minute, a much more rapid rate than with most birds I have met. As I approached him he treated me to a new sound, the strangest of all, a kind of chatter something like the rattle of a Kingfisher, given with throat and tail quivering. Sometimes this did not last more than two seconds, but at other times, it extended from 4.8 to 5.5 seconds.

I then saw the other parent for the first time. She had two larvae in her bill and was minus her tail. Curiously enough, the only note she gave was the

tsip. I retired under an oak to give them a chance to quiet down, but to no purpose, for as soon as I reappeared, the male was at it again: *tau tau tau chrecccccccc*. In one minute he uttered 64 *taus* and 56 *tsips*. It was impossible to get any idea of the location of the nest, for the bird made a great commotion over widely different places.

Wishing to make sure that it was the male that had the extensive vocabulary, I made a wide circuit and came up on top of the hill where I could see a dead tree on the territory of this particular pair. After some wait, the bird with the tail appeared on this tree and gave two songs.

Early the next morning I visited the hill top again, but, although two neighboring males sang fairly steadily from 5:30 till 6:30, the bird observed previously did not sing at all. When I came down to bid them goodbye, I found both parents carrying insects; my greeting from the male consisted in 137 *taus* in the space of one minute.—MARGARET MORSE NICE, *Amherst, Massachusetts, August 18, 1929.*



Fig. 75. NESTING SITE OF ASH-THROATED FLYCATCHER IN INSULATION BOX IN MORAGA VALLEY, CONTRA COSTA COUNTY.

Unusual Nesting Site of Ash-throated Flycatcher.—There is a station on the Sacramento Short Line in Moraga Valley, Contra Costa County, called Valle Vista. The line is on the side of a hill and a small station house is in place for patrons. The County road parallels the line and at this point is about fifty feet distant and twenty feet lower in grade. There are numerous poles along the right of way and adjacent thereto, and owing to the numerous changes in alignment it has been found necessary to use guy wires to make the line safe. The surrounding territory is fairly open in character having been subdivided into small acreages. Several houses are in the vicinity. A small creek flows through the flat fields and is lined with heavy brush, willows, and other trees.

On May 16, 1929, the writer was attracted to a lone Ash-throated Flycatcher (*Myiarchus cinerascens cinerascens*) sitting on a telephone wire alongside the road. Having stopped the auto so as to watch, it was but a short time before another flycatcher, the female, was seen to fly up from the creek carrying nesting material in her bill. In a short space of time she flew to the top of an insulation box such as surrounds a guy wire of the power line. This particular insulation box, within fifty feet of the station building, is about five feet long and is built with an opening about four inches square surrounding the guy wire. The bird disappeared within the box and her nesting site was revealed.

On May 18 the nest was again visited. Mr. Charles Bryant took several pictures of the female as she was leaving or was about to enter the nesting site. At times he approached within ten feet and I was somewhat afraid that the birds would desert the location for some other. The nest of this species is difficult to locate at any time and the birds are careful not to reveal the site of their home.

On May 29 the nest was again visited and the parent birds were nowhere in evidence. After waiting some time a light was thrown into the opening with a flashlight and the nest was seen close to eighteen inches below the entrance. Four fresh eggs were taken, which were later donated to the University of California. The nest was left undisturbed but the birds never returned to lay another set. How the birds ever obtained the initial support is a mystery, as the opening was



Fig. 76. FEMALE ASH-THROATED FLYCATCHER PERCHED WITH NESTING MATERIAL AT ENTRANCE TO NESTING CAVITY.

not obstructed in any way below the nest. Just try to place straw in an opening so that it will stay in place and gradually build up a nest above it piece by piece! You will find that patience is lost very easily.

Two pictures are reproduced herewith (figs. 75 and 76) to show the structure in which the nest was built and the female with nesting material.—L. PH. BOLANDER, Oakland, California, September 10, 1929.

Notes on the Food and Feeding Habits of Certain Birds.—California Gulls (*Larus californicus*) are common in San Diego throughout the fall, winter and spring months, visiting the public schools to feed on the scraps from the lunches of the pupils. They are often joined by Western Gulls (*Larus occidentalis*) and by an occasional Bonaparte Gull (*Larus philadelphia*) and Glaucous-winged Gull (*Larus glaucescens*). On clear mornings after rainy nights, the California Gulls may be seen in numbers stalking along the paved streets of the residential sections, picking up and devouring the numerous earth worms which have become stranded there.

While previous observations (Condor, xxx, 1928, pp. 362-363) have shown me that flower nectar is taken by several species of birds besides the hummingbirds I have been rather surprised to find through additional observations that it is probably a daily item in the diet of two species, the Arizona Hooded Oriole (*Icterus cucullatus nelsoni*) and the Audubon Warbler (*Dendroica auduboni*). The former species may

now be observed making daily visits to a cluster of tree tobacco (*Nicotiana glauca*) near my home and methodically probing all of the tubular yellow flowers. Frequent examinations of the blossoms have disclosed no insects. I have often seen these orioles about my cultivated flowers and have been told by Mrs. I. G. Silver, of National City, California, that the orioles tear open the blossoms of her morning-glory vines to secure the nectar and that they utterly ruined the appearance of a row of Easter lilies in the yard of a neighbor by splitting open the flowers for this purpose. I have also seen this species on numerous occasions sipping nectar from the blossoms of several species of *Eucalyptus* in Balboa Park. The gaudy color of the male is well suited to a prober of bright blossoms.

On January 30, 1929, and on many subsequent occasions, I watched a banded Audubon Warbler feeding from the flowers of the sugar gums (*Eucalyptus corynocalyx*) of a certain area. The bird would fly to a cluster of blossoms, carefully probe each one and then flit to another cluster. On February 7, two unbanded Audubons were observed feeding from the flowers of the same trees. On April 19 a full-plumaged male House Finch (*Carpodacus mexicanus frontalis*) was seen feeding from these blossoms and after sipping from several of them it carefully wiped its beak on a branch before taking flight.

Black Phoebe (*Sayornis nigricans*) are common residents in Balboa Park, and on May 24, 1929, I was surprised to see one of these flycatchers kill and eat a Jerusalem cricket (*Stenopelmatus longispina*). I did not see how the phoebe secured this subterranean form. Black Phoebe have often been seen to alight on a lawn and pull out gray lepidopterous larvae from deep in the grass. On October 31, 1928, I watched a Black Phoebe extract from the pod and swallow one of the dry hairy seeds of the bottle tree (*Sterculia diversifolia*).

Pine Siskins (*Spinus pinus*) are frequently seen in Balboa Park during the winter and spring months and at such times their food apparently consists almost entirely of the seeds of the various species of *Eucalyptus*. They not only obtain the seed from the pods of the trees but also hunt among the fallen leaves on the ground. At such times they may often be approached to within five feet or less. Green-backed and Willow goldfinches (*Astragalinus psaltria hesperophilus* and *A. tristis salicamans*) also feed freely on the seeds of these trees.

On June 2, 1929, a male Black-headed Grosbeak (*Hedymeles melanocephalus*) was seen perched on an electric light wire in East San Diego and from this perch it would make short flycatcher-like flights, presumably after insects. While the insects were not actually seen, the actions were so typically those of flycatching birds that no doubt as to the purpose of the flights was left in the mind of the observer. On June 5, a female Arizona Hooded Oriole was seen flycatching from a perch on these same wires. Her catch was fed to a well-grown young and the insects could be plainly seen in the beaks of the two birds. The writer has found this habit to be common to many species of birds besides true flycatchers.—FRANK F. GANDER, O'Rourke Zoological Institute, Balboa Park, San Diego, California, June 5, 1929.

Additional Bird Records from the Pleistocene of Rancho La Brea.—Since the last general report on the Pleistocene birds of Rancho La Brea (Miller, L., Carnegie Inst. Wash., Publ. 349, 1925, pp. 63-106) several thousand specimens in the collections of the Los Angeles Museum have been examined, first by Miss Rachel Husband, and later by the present writer.

The writer wishes now to record two species which have come to light as a result of these surveys; neither species has heretofore been reported from the Rancho La Brea deposits. Both species are of the family Ardeidae. It is highly probable that when the Anseriformes and Charadriiformes from these deposits are restudied in detail, there will be still further additions to the avian record from the asphalt pits.

Florida caerulea (Linnaeus)? A complete left tarsometatarsus from Pit 61; Los Angeles Museum specimen no. K1136. Comparison has been made with tarsometatarsi of modern *Florida caerulea* and *Egretta thula*. The identification is questioned, in spite of the similarity of the fossil to *Florida caerulea*, because of the absence of a specimen of *Hydranassa tricolor* for comparison. The fossil tarsus corresponds

in size with that of the Louisiana Heron (measurements made on skins) as well as with the Little Blue Heron, and it is possible that structurally, also, the species are similar.

Measurements of fossil specimen:

Greatest length.....	92.2 mm.
Breadth of proximal end.....	8.3
Breadth of distal end.....	8.5

Nycticorax nycticorax (Linnaeus). A complete left tarsometatarsus from Pit 67; Los Angeles Museum specimen no. E1839.

Measurements of fossil specimen:

Greatest length.....	91.0 mm.
Breadth of proximal end.....	12.3
Breadth of distal end.....	11.7

—HILDEGARDE HOWARD, *Los Angeles Museum, August 29, 1929.*

Woodpecker Perching on a Wire.—The Lewis Woodpecker (*Asyndesmus lewisi*) has the reputation of possessing a number of characteristics not usually associated with its family. In sustained flight it has the appearance of a small crow, reminding me strongly of the European jackdaw. Its aerial sallies after insects, with return to the starting point, are performed in true flycatcher fashion. But most un-woodpecker-like of all, it seemed to me, was an act observed this summer, when I saw a Lewis Woodpecker standing on an electric wire, as comfortably balanced as any perching bird. Behind a cottage which I was occupying at the time, near Colorado Springs, Colorado, ran a service line of poles and wires, which was used as a sort of highway by a pair of Lewis Woodpeckers. They commonly progressed by passing from one pole to the next, describing a downward arc between poles and alighting on or near the top of each pole. But on July 4, I saw one of the birds standing on a wire some distance from a pole. Observers to whom I mentioned the incident stated that they could not recall ever having seen a woodpecker of any kind perched on a wire.—CLINTON G. ABBOTT, *San Diego Society of Natural History, San Diego, California, July 29, 1929.*

California Black Rail in Marin County, California, in August.—On Sunday, August 11, 1929, while on an Audubon Association of the Pacific field trip, one of the members, Mr. Albert B. Stephens, picked up from the salicornia, about 25 feet east of the railroad track at Manzanita, a dead female (young of the year) California Black Rail, *Creciscus jamaicensis coturniculus* (Ridgway), which through the interest of Mr. C. Lockerbie, leader, was brought to the writer for identification. The date of this rare find in this locality seemed to be an early one and prompted the query in the minds of some: has this tiny mite been nesting right under our noses after all? Who knows? Through the courtesy of Dr. Grinnell, the specimen was identified and placed on file (no. 53990) in the Museum of Vertebrate Zoology, University of California, Berkeley.—BESSIE W. KIBBE, *Berkeley, California, August 15, 1929.*

The Elf Owl in Western Arizona.—An attempt last year to find out where one might expect to meet the Elf Owl (*Micropallas whitneyi*) in Arizona showed me that there was much uncertainty on the part of various authorities regarding its seasonal and its geographic distribution. The field notes which I was able to assemble add some evidence to the small total. The species seems to be rare west of and south of the middle of the state. Four camps were made in the saguaros between Mohawk and Yuma—two in February, one in May, and one in the first week of June. During February a ladder was used to search nearly a hundred woodpecker holes in the cactus, but no evidence of elf owls was found at any of these camps.

Beginning May 29, a survey was extended eastward. The first camp was made on the Papago Indian Reservation near Covered Wells, in typical saguaro association, and observation was carried on during several hours of the night and the

two twilights without locating any owls. The following night camp was made in the live oaks of the Tumacacori Mountains, about thirty miles northeast of Nogales. Here the sun had little more than set before elf owls began whistling in various directions. One was collected and several others were located. This station is high above the saguaro belt, and produced such Sierran species as Mearns Quail and Lawrence Flycatcher. The owls showed evidence of breeding in holes in cottonwoods.

The next station was just outside Tucson on the Rillito, in saguaro and mesquite association. Here again the birds began activity as soon as the sun was well down, and they proved to be extremely abundant among the mesquites. They were observed flying up into the saguaros and entering woodpecker holes. The next day, June 2, two complete sets of eggs (of two each) were taken from holes in the saguaros. The return to California was made without further opportunity to look for the birds.

My experience suggests that:

(1) During the breeding season the Elf Owls readily make their presence known at early twilight and continue calling for some time,

(2) They are not difficult to locate,

(3) They are rare or absent in the southwestern part of the state,

(4) They breed in the mountains up to altitudes far above the saguaro belt,

(5) They breed later than one would expect owls in warm climate, with secure nesting cavities, to breed.

Notes on the winter distribution of this owl are much to be desired.—LOYE MILLER, *University of California at Los Angeles, July 30, 1929.*

Flying Defense of a Golden Eagle.—On September 2, 1929, we made an interesting trip down the coast of Monterey County from Monterey to a point about fifteen miles below Big Sur. This is the end of the Roosevelt Highway at the present time.

In the early afternoon we noted a young Golden Eagle (*Aquila chrysaetos*) being harried by a Western Red-tailed Hawk (*Buteo borealis calurus*). The hawk would circle to gain elevation and then swoop down like a falling body to attack. Just before the hawk reached his enemy the Golden Eagle would roll over in the air so as to have its talons uppermost and would complete the roll as the hawk swept by. This was done several times while the birds remained in sight. The eagle did not seem to hurry its flight at any time and gave the impression that it would rather be left alone than fight back.—L. PH. BOLANDER and CHAS. A. BRYANT, *Oakland, California, September 10, 1929.*

EDITORIAL NOTES AND NEWS

In the death of Roswell Samuel Wheeler in September, 1929, the Cooper Club has lost another of its old-time members. Wheeler joined the Club in 1894, the second year of its existence, to become one of the small coterie whose interest insured the continued activity of the Northern Division. In later years there were periods when his attendance at meetings was irregular or impossible, but he kept

in touch with the Club to the last, and his concern in our well-being was unflagging. Wheeler's interest in ornithology lay mainly in egg collecting, and throughout his life his vacations and holidays were, when possible, devoted to this pursuit. For the past twenty years or more he was in the Oakland School Department, serving as principal in several different schools.—H. S. SWARTH.

The importance of an adequate index for a magazine is seldom realized until one attempts to analyze the contents of some periodical which lacks one. This year, Miss Selma Werner, of San Francisco, merits special thanks for preparing the annual index which terminates volume XXXI of THE CONDOR.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

JULY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on July 25, 1929, at 8:00 p. m., in Room 101, Zoology Building, University of California, Berkeley, with about forty-five members and guests present. Vice-president Clabaugh presided over the meeting. The reading of the Northern Division minutes for June was dispensed with, and only the applications for membership were read from the Southern Division's minutes for May. Minutes of the business session held by the Pacific Division of the A. A. A. S. were acknowledged by the secretary *pro tem*. There were no new applications for membership or committee reports. The invitation of the Santa Clara Valley Audubon Association to meet with them on October 24 in San Jose was considered, and on motion of Mr. Linsdale, seconded by Mr. Storer, the Secretary was instructed to send a note of regret, since it did not seem feasible for the Club as a whole to accept their kind invitation at that time. Mr. Storer called the attention of the Club to a pamphlet published by the N. Y. State Museum at Albany, written by Mr. Aretas Saunders, which gives a summary of Mr. Saunders' observations on birds' songs.

Several of the comments on current events among the birds concerned the American Robin. Mr. Dexter told of watching robins feed their young in a nest placed on the concrete foundation of a deep pit under the testing laboratory in the General Electric Building in New York. Although from 20 to 30 men were busy in the laboratory day and night the robins fed their young and brought them to maturity. Mr. Storer commented on the continued spread in range of the Western Robin and the finding of an old nest in a peach orchard several miles south of Marysville in March. He also reported the attendance

of a male European Fieldfare upon a family of Western Robins found by Mrs. Kelly in Alameda.

Mrs. Allen reported upon the food of Evening Grosbeaks at Cisco.

The program of the evening was given by Dr. E. Raymond Hall, who had recently returned from a field trip in Nevada. Although Dr. Hall's object in visiting Nevada was the collection of mammals many birds were observed incidentally and the collecting of the Dusky Grouse in the aspen belt on the west side of Wheeler Peak, and of a peculiar form of junco, provided important additions to the known range of the former and the subspecific standing of the latter.

In addition to the distributional range of birds on the east and west sides of Wheeler Peak, Dr. Hall gave an interesting description of Lehman Cave, a national monument on Wheeler Mountain, and of a rattlesnake's den observed on Red Butte in the bottom of the valley. Encouraging was the report of large numbers of water birds nesting in the Newlands irrigation district near Fallon.

Adjourned.—AMELIA S. ALLEN, *Secretary pro tem*.

AUGUST.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on August 22, 1929, at 8:00 p. m., in Room 101, Zoology Building, University of California, Berkeley. About forty members and guests were present; Vice-president Clabaugh occupied the chair. Minutes of the Northern Division for July were read and approved. Minutes of the Southern Division for June were read.

Mr. B. C. Cain reported interesting bird observations made while camped near Shadow Lake, in the Sierra Nevada. Mr. C. A. Bryant told of having seen Surf Birds and Black Turnstones during the past three weeks from the observation platform at the Cliff House, San Francisco.

The evening's speaker was Mr. Adrey E. Borell, who reported upon the "Bird-life of Northeastern Nevada". Mr. Borell's talk was illustrated with a series of excellent lantern slides, made available through the courtesy of the Ralph Ellis, Jr., Museum. Mr. Borell's clear account of the activities of such rare species as the Sandhill Crane and the Sage Hen was much appreciated.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

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